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July 22, 2003

Mail Stop Non-Fee Amendment
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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TECHNOLOGY CENTER 2800

Re: Applicant(s): Zhong Dong et al.
Assignee: Mosel Vitelic, Inc.
Title: Floating Gate Nitridation
Application No. 10/071,689
Examiner: Pizarro Crespo, Marcos D.
Docket No.: M-12327 US
Filed: February 8, 2002
Group Art Unit: 2814

Dear Sir:

Transmitted herewith are the following documents in the above-identified application:

- (1) Return Receipt Postcard;
- (2) This Transmittal Letter (1 page in duplicate);
- (3) Reply to Office Action (4 pages)

- ☒ No additional fee is required.
☒ The fee has been calculated as shown below:

CLAIMS AS AMENDED

	<u>Claims Remaining After Amendment</u>		<u>Highest No. Previously Paid For</u>		<u>Present Extra</u>	<u>Rate</u>	<u>Additional Fee</u>
Total Claims	11	Minus	20	=	0	x \$18.00	\$ 0.00
Independent Claims	1	Minus	3	=	0	x \$84.00	\$ 0.00
<input type="checkbox"/>	Fee of _____ for the first filing of one or more multiple dependent claims per application						\$
<input type="checkbox"/>	Fee for Request for Extension of Time						\$
<u>Total additional fee for this Amendment:</u>							\$
<input checked="" type="checkbox"/>	Conditional Petition for Extension of Time: If an extension of time is required for timely filing of the enclosed document(s) after all papers filed with this transmittal have been considered, an extension of time is hereby requested.						
<input checked="" type="checkbox"/>	Please charge our Deposit Account No. 50-2257 in the amount of						\$ 0.00
<input checked="" type="checkbox"/>	Also, charge any additional fees required and credit any overpayment to our Deposit Account No. 50-2257						
Total:							\$ 0.00

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2003

Michael Shenker
Attorney for Applicant(s)

7-22-03
Date of Signature

Respectfully submitted,

Michael Shenker
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.: 10/071,689 Filing Date: February 8, 2002
Confirmation No.: 2077
First Named Inventor: Zhong Dong
Assignee: Mosel Vitelic, Inc.
Title: Floating Gate Nitridation
Examiner: Pizarro Crespo, Marcos D. Art Unit: 2814
Attorney Docket No.: M-12327 US

San Jose, California
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REPLY TO OFFICE ACTION

Dear Sir:

This is a reply to the Office Action dated May 7, 2003.

Claims 17, 20-28 and 30-35 are pending.

1. Claims 17, 21-25, and 27 were rejected under 35 U.S.C. 103 over Hagiwara (U.S. patent 5,847,427) in view of Misium (U.S. patent 6,261,973) and George Misium ("George", U.S. patent 6,140,024).

1-A. Claim 17 was discussed in connection with Hagiwara and Misium in Applicants' Amendment filed April 16, 2003, on page 5. As stated therein, Claim 17 recites nitriding a silicon surface by remote plasma nitridation (RPN). Hagiwara teaches away from the RPN by emphasizing the desirability of performing the nitridation in a CVD device that can also be used in the subsequent step of forming an "interpoly insulation film" (Hagiwara's col. 8, lines 4-13). Misium does not teach that his RPN device can be used for the interpoly insulation film deposition in Hagiwara..

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George is no more pertinent than Misium in this respect.

MPEP 2145, subsection X.D.2, states that references cannot be combined where a reference teaches away from their combination. This is one reason why Claim 17 is believed to be allowable.

1-B. Another reason, also discussed in Applicants' Amendment of April 16, on page 5, with respect to Misium and Hagiwara, is that Misium is directed to the RPN of silicon dioxide, not the RPN of silicon as recited in Claim 17. Misium discloses incidental RPN of silicon during the RPN of his silicon dioxide, but does not disclose any benefits of the silicon RPN. In particular, Misium does not teach that his silicon RPN is suitable for the purposes of Hagiwara (prevention of bird's beak formation at the upper edges of the floating gate; Hagiwara's Abstract and col. 3, lines 12-22 and 45-52).

In this respect, George is no more pertinent than Misium. The Examiner points to George's paragraph starting in col. 5, line 62, which states:

... Additional layers, such as polysilicon and amorphous silicon ... can be deposited and protected using the RPN.

This statement does not teach an RPN of polysilicon or amorphous silicon as explained immediately below.

George's Fig. 1E shows a silicon dioxide layer 12 formed on silicon wafer 10. Oxide 12 has an opening exposing the wafer 10. The opening is formed using photoresist, and George is concerned with protecting the silicon wafer 10 from contamination during the resist stripping (col. 2, lines 2-3). George protects silicon 10 by performing RPN of oxide 12. More particularly, the resist 14 (Fig. 1C) is formed on oxide 12 at the location of the opening to be formed in oxide 12 (the opening has not yet been formed). Then the structure is nitrided with the RPN to form a nitrided layer 22. The resist is stripped (Fig 1E), exposing the non-nitrided portion of oxide 12. Of note, the silicon 10 is not exposed at this time. Then the non-nitrided portion of oxide 12 is etched (Fig. 1E) to expose the silicon 10. See George, col. 4, lines 30-49. This process "prevents the exposure of the wafer 10 to contaminants from the photoresist layer 14 The photoresist layer 14 can be removed ... without

exposing the surface of the silicon wafer 10 to contamination from the phtotresist stripping.” George, col. 4, lines 51-60.

Wafer 10 is “single crystal silicon” (col. 4, lines 34-35), but a similar process can be used to protect “polycrystalline and amorphous silicon layers” as stated in col. 5, lines 65-66, in the passage cited by the Examiner. Clearly, this passage refers to the RPN of silicon dioxide formed over a polycrystalline or amorphous silicon layer and not to the RPN of polysilicon or amorphous silicon.

Claims 20-28 depend from Claim 17.

Claim 30 is believed to be allowable for reasons similar to the reasons given above for Claim 17. Claims 31-35 depend from Claim 30.

2. Claim 26 was rejected under 35 U.S.C. 103 over Hagiwara in view of Misium, George and Furukawa (U.S. patent application 2002/0185675).

Claim 26 depends from Claim 17. Furukawa is cited for teaching decoupled plasma nitridation (DPN) of a silicon oxide surface. This teaching does not overcome the deficiencies of Hagiwara, Misium and George described above in connection with Claim 17.

3. Claims 17, 20, 28, and 30-35 were rejected under 35 U.S.C. 103 over Lin in view of Misium and George. These claims are believed to be allowable for reasons similar to the reasons given above in section 2-A. See also Applicants’ Amendment dated April 16, 2003, page 6. Briefly, Lin teaches nitridation (but not RPN) of polysilicon 120 to reduce the polysilicon oxidation rate in order to form a better ONO layer for a flash memory cell. Misium does not teach that his incidental RPN of silicon meets the goals of Lin. George is no more pertinent than Misium, as discussed above in section 2-A.

Any questions regarding this case can be addressed to the undersigned at the telephone number below.

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